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Chris Gekas
California Energy Commission
1516 Ninth Street, MS 25
Sacramento, CA 95814-5512

Subject: 2008 Building Energy Efficiency Standards Comments on AFDD Compliance Options Proposals

Dear Chris and Mazi:

I am writing to provide comments on the Automated Fault Detection and Diagnostic (AFDD) proposals by Martyn Dodd of EnergySoft, LLC . These proposals are titled, "Fault Detection and Diagnostics for Air Handling Units and VAV Boxes," and "Fault Detection and Diagnostics for Rooftop Air Conditioners." They are dated 6/29/2007.

Before I start with my specific comments, I would like to say that I am a proponent of incorporation of AFDD into the Standard and into design practice. I was hired by New Buildings Institute to do a case study of the NIST AFDD algorithms and spent a significant amount of time with Louis Coughner previously of Enovity who was implementing them in the 450 Golden Gate building. Since this is a nascent field I support this implementation as a compliance option for 2008 with possible inclusion of a Standard's prescriptive requirement in 2011 (depending on the market maturity of the technologies at the time of the 2011 adoption process).

I don't have the leisure to review these proposals in depth as comments are due today. However I have read both of them and have several comments:

1. The proposed changes should be shown in strikeouts and underlines. This is editorial but required.

2. The concept of derating a standard building model of a system or equipment then providing a non-derated performance for the use of AFDD is sound. However as I detail below in my comments, I have issues with the specific proposals for derating.

3. In general, I do not think that the proposals have justified the specific levels of energy savings. In particular:

    a. There is no basis provided for the 10% derating of the EIR on the packaged units without AFDD.

b. The reports used for providing a 50% derating of the economizers on the both the packaged unit AFDD and VAV/RTU proposals (the oft cited AEC PIER work and the work by Proctor and Modera in SCE) both predated the Economizer Acceptance Requirements of Title 24 2005. These requirements have already been adopted under the assumption that they will reduce economizer failures and therefore the failure rate in this proposal should be significantly less than 50%. I propose 10% unless data can be provided to prove otherwise on units that have passed the Title 24 2005 acceptance tests.

c. There is no basis for the 10% derating of VAV box minimums on the VAV/RTU AFDD report

4. When systems fail in the field they cannot always be assumed to increase energy usage. A VAV box whose reheat coil valve never opens will in fact save energy. These reports do not discuss this fact. In the case of the reheat coil valve failure or a VAV box blockage the feedback mechanism is generally a comfort complaint. Again the fact that failures are currently detected without AFDD is also omitted from the reports.

5. The derating of a standard building's EIR will have impacts on other measures that will change their credit. For example if a standard building is modeled with a derated (less efficient, higher EIR) cooling coil, an air side economizer, evaporative precooler, SAT reset scheme will show increased energy savings with no implementation of AFDD. Because of this I strongly suggest that the deratings ONLY be applied for the purpose of calculating the AFDD credit and not to all models (with or without AFDD).

6. Similarly the 10% increase in the VAV box minimum position will have a very large impact on both reheat and fan energy. Neither of these should be part of a project without AFDD.

7. As previously mentioned I spent several days with Louis Coughnour at the 450 Golden Gate project. I have since spoken to several engineers from Enovity and they confirmed my observations: these algorithms take significant time to tune and adjust in the field. When Louis started he was getting thousands of false alarms from the AFDD algorithms each day. After weeks of work he had it down to 20-30 and they were 90% accurate. The cost estimates of $100-200 for precanned software and $1000 for field installed software are grossly understated. In my opinion the AFDD algorithms will need their own acceptance tests to prove that they have indeed been properly tuned.

8. There are no specific proposals on how to change the acceptance tests although this is mentioned in the proposals.

In sum I will be unresolved in my comments on this proposal unless all of the following are achieved:

1. The proposed deratings are significantly reduced to account for the current Acceptance Test requirements or directly supported by field surveys on Title 24 2005 compliant buildings. I am willing to accept the following defaults if no field data is available:

    a. VAV boxes 5%

    b. Economizers 10%

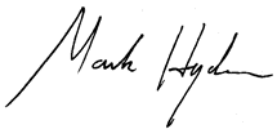
    c. Compressors 5%

2. The derating only takes place for systems which are being installed with AFDD (to provide a credit for AFDD)

3. Acceptance tests are provided to prove that the AFDD algorithms are properly tuned.

I look forward to working with you on getting a solid and defensible compliance option in place.

Sincerely,
Taylor Engineering LLC



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